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Tektronix

VX4357
Relay Switching Module

070-9124-02

VXI bus

VX4357
Relay Switching Module

Section 1
General Information and Specifications

Introduction

The VX4357 Relay Switching Module is a printed circuit board assembly for use in a mainframe conforming to the VXIbus Specification, such as the VX1400 "C" size mainframe used in the Tektronix/CDS IAC System. The module provides 32 independently controlled single-pole, double-throw relays. Individual relays or all relays can be opened or closed under program control.

The amount of delay between successive operations and the relay closure dwell time can be controlled by software. Delay times from 0 to 65535 milliseconds can be selected. The module is programmed by transmitting ASCII characters from the system controller through the VXI system to the module.

The module's commands also provide access to system information. The position of any individual relay (open or closed) may be read back by the system controller and is also displayed by LEDs on the module's front panel. Other commands return the programmed time delay and identification information about the module.

Note that certain terms used in this manual have very specific meanings in the context of a VXIbus System. A list of these terms is presented in the VXIbus Glossary (Appendix C).

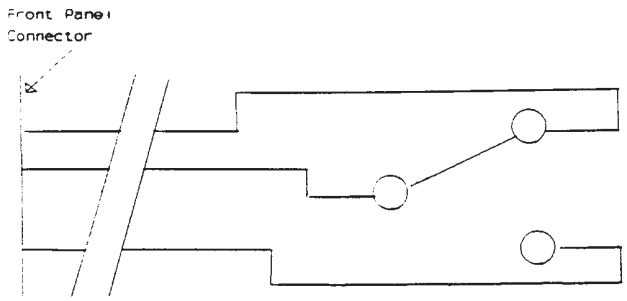

Figure 1: Typical SPDT Relay

Specifications

Configuration: 32 single-pole double-throw (SPDT) relays.

Relay: Aromat Corporation model S2EB-5V (per CDS specification).

Contact Ratings:
Maximum switching power:
1000 VA ac, 90 W dc.
Maximum switching voltage:
250 V ac, 48 V dc. **CAT II, 48 V dc**
Maximum switching current:
5 A (<40 operations per minute)

Maximum Power Dissipation Per Connector: 1 Watt. To determine the current capacity for specific applications, assume 20 milliohms resistance per pin.

Maximum Operating Speeds: 100 operations per second.

Programmable Relay Delay: 0 to 65,535 msec.

Recommended Maximum Operating Conditions and Operational Life:

Rate*	Volts	Amps	Op. Life*
40 OPM	30 V dc	3.0 A	2×10^5
40 OPM	250 V ac	4.0 A	10^5
40 OPM	130 V ac	5.0 A	1×10^4
40 OPM	20 V dc	5.0 A	2×10^5
20 OPS	30 V dc	2.0 A	10^6
20 OPS	250 V ac	2.0 A	10^6
100 OPS	1 V dc	1.0 mA	10^6

NOTE: OPS - operations per second
OPM - operations per minute
Op Life - operational life

An operation is defined as a close or an open. A close/open cycle is two operations.
* Values are for a 5% failure probability.

Duty Cycle: Continuous.

Dwell: Recommended dwell time at maximum switching rate is 4 msec minimum.

Signal Path Specifications: Single-line thermal offset:
Less than 10 microvolts.

Signal path resistance:
Initial: Less than 300 milliohms.
After full load-life: Less than 400 milliohms.
Insulation resistance:
Greater than 10 Gigohms.

Isolation - Wiper to Open Contact:

1 kHz	Less than -85 dB
10 kHz	Less than -55 dB
100 kHz	Less than -36 dB
1 MHz	Less than -18 dB

Measurement was made on both the normal open and normal closed contacts with a 600 ohm termination. The signal was applied to the wiper of the relay.

Crosstalk Between Channels:

1 kHz	Less than -90 dB
10 kHz	Less than -80 dB
100 kHz	Less than -60 dB
1 MHz	Less than -40 dB

Measurement was made on a closed relay with a 600 ohm termination and signal applied into an adjacent channel, open or closed relay, with and without 600 ohm termination.

Power Up: When power is turned on, all relays are open.

Power Down: When power is turned off, all relays are open.

VXIbus Compatibility: Fully compatible with the VXIbus Specification for **V1.4** message-based instruments with the Halt switch in the ON position.

Device Type: VXI message based instrument, **V1.4**

VXI Protocol: Word serial.

VXI Card Size: C size, one slot wide.

Module-Specific Commands: All module-specific commands and data are sent via the VXIbus Byte-Available command. All module-specific commands are made up of ASCII characters. Module-specific data may be in either ASCII or binary format.

VMEbus Interface: Data transfer bus (DTB) slave - A16, D16 only.

VXIbus Data Rate: 300K bytes/sec maximum.

VXIbus Commands Supported:

All VXIbus commands are accepted (e.g. DTACK* will be returned). VXI V1.3 commands have effect on this module.

All Primary, MBD, VXIbus Instrument-required commands are supported:

- Abort Normal Operation
- Begin Normal Operation
- Byte Available
- Byte Request
- Clear
- End Normal Operation
- Read Protocol
- Read Protocol Error

The following additional commands are supported:

- Read STB
- Read Interrupters
- Asynchronous Mode Control
- Control Event
- Control Response
- Set Lock
- Clear Lock
- Trigger

All other commands will generate Word Serial Protocol 'Unsupported Command' errors.

VXIbus Registers:

ID
Device Type
Status
Control
Protocol
Response
Data Low
See Appendix A for definition of register contents.

Power Requirements:

All required dc power is provided by the power supply in the VXIbus mainframe.

Voltage:

5 volt supply: 4.75 V dc to 5.25 V dc.

Current (Peak Module, I_{PM}):

5 volt supply: 2.2 amps PTP.

Cooling:

Provided by fans in the mainframe. The module will have a temperature rise of < 10°C with 0.9 liters/sec per slot of air and a pressure drop of 0.16 mm of H_2O.

	For 10°C rise, 1.2 liters/sec air at 0.01 mm of H_2O.
Fuses:	Replacement fuse: Littelfuse P/N 273005 SA, 125V, fast blow
Temperature:	0°C to +50°C, operating. -40°C to +85°C, storage.
Humidity:	Less than 95% R.H. non-condensing, 0°C to +30°C. Less than 75% R.H. non-condensing, +31°C to +40°C. Less than 45% R.H. non-condensing, +41°C to +50°C.
Radiated Emissions:	Complies with VXIbus Specification.
Conducted Emissions:	Complies with VXIbus Specification.
Module Envelope Dimensions:	VXI C size. 262 mm x 357 mm x 30.5 mm (10.3 in x 13.9 in x 1.2 in)
Dimensions, Shipping:	When ordered with a Tektronix/CDS mainframe, this module will be installed and secured in one of the instrument module slots (slots 1-12). When ordered alone, the card's shipping dimensions are: 406 mm x 305 mm x 102 mm. (16 in x 12 in x 4 in).
Weight:	1.60 kg. (3.56 lbs.)
Weight, Shipping:	When ordered with a Tektronix/CDS mainframe, this module will be installed and secured in one of the instrument module slots (slots 1-12). When ordered alone, the card's shipping weight is: 2.27 kg. (5.06 lbs.)
Mounting Position:	Any orientation.
Mounting Location:	Installs in an instrument module slot (slots 1-12) of a C or D size VXIbus mainframe. (Refer to D size mainframe manual for information on required adapters.)
Front Panel Signal Connectors:	2 DD-50P connectors. Refer to Appendix B for connector pinouts.
Recommended Cables:	Two VX1657S Data cables.

Equipment Supplied:	1 - VX4357 Module.
Optional Equipment:	2 - VX1657S cables or VX1780S connectors.
Software Revision:	V1.3

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